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BRITISH MUSEUM (NATURAL HISTORY)

INSECTS OF SAMOA
AND OTHER SAMOAN TERRESTRIAL
ARTHROPODA

PART VI. DIPTERA

FASC. 9. Pp. 329-366

PHORIDAE, AGROMYZIDAE, MICROPEZIDAE,
TACHINIDAE and SARCOPHAGIDAE (SUPPLEMENT).

By J. R. MALLOCH

(U.S. Bureau of Biological Survey, Washington, D.C., U.S.A.).

WITH FIFTEEN TEXT-FIGURES.



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INSECTS OF SAMOA

AND OTHER SAMOAN TERRESTRIAL ARTHROPODA

Although a monograph, or series of papers, dealing comprehensively with the land arthropod fauna of any group of islands in the South Pacific may be expected to yield valuable results, in connection with distribution, modification due to isolation, and other problems, no such work is at present in existence. In order in some measure to remedy this deficiency, and in view of benefits directly accruing to the National Collections, the Trustees of the British Museum have undertaken the publication of an account of the Insects and other Terrestrial Arthropoda collected in the Samoan Islands, in 1924-1925, by Professor P. A. Buxton and Mr. G. H. E. Hopkins, during the Expedition of the London School of Hygiene and Tropical Medicine to the South Pacific. Advantage has been taken of the opportunity thus afforded, to make the studies as complete as possible by including in them all Samoan material of the groups concerned in both the British Museum (Natural History) and (by courtesy of the authorities of that institution) the Bishop Museum, Honolulu.

It is not intended that contributors to the text shall be confined to the Museum Staff or to any one nation, but, so far as possible, the assistance of the leading authorities on all groups to be dealt with has been obtained.

The work is divided into nine "Parts" (see p. 3 of wrapper), of which each is subdivided into "Fascicles." Each of the latter, which appear as ready in any order, consists of one or more contributions. On the completion of the systematic portion of the work it is intended to issue a general survey (Part IX), summarising the whole and drawing from it such conclusions as may be warranted.

A list of Fascicles already issued will be found on pp. 3 and 4 of this wrapper.

N. D. RILEY,
Keeper of Entomology.

BRITISH MUSEUM (NATURAL HISTORY).
CROMWELL ROAD, S.W.7.

INSECTS OF SAMOA

PART VI. FASC. 9

DIPTERA

PHORIDAE, AGROMYZIDAE, MICROPEZIDAE, TACHINIDAE
and SARCOPHAGIDAE (Supplement)

By J. R. MALLOCH, U.S. Bureau of Biological Survey, Washington, D.C.,
U.S.A.

(With 15 Text-figures.)

PHORIDAE.

THIS family contains a large number of species of very diverse structure and habits, some of the more common saprophagous forms being widely distributed. Most of the flies are very rapid in their movements, and coupled with this their small size makes it difficult to capture them unless a special effort is made to do so.

The most peculiarly specialized forms are inhabitants of ant and termite nests, usually as commensals, but a few are known to be parasitic on ants. The great majority feed on fungi, decaying vegetable matter and carrion, while a few are found in the underground nests of mammals and in caves, their food usually consisting of the excrement and remains of the inhabitants. I have found large numbers of larvae and puparia of *Diploneura venusta*, Coquillett, in the jars of natural history specimens put up in brine. There is one closely related species of this genus in the present collection.

Bezzi has recorded only four genera from Fiji, each with a single species, two of the records being accredited to Brues.

Diploneura Lioy.

This generic name is used instead of *Dohrniphora*, Dahl, which has been in general use by specialists in the group until a few years ago.

1. *Diploneura instabilis*, n. sp.

A small fulvous yellow species, with the frons and back of head black, the third antennal segment brown, thoracic dorsum, including the scutellum, dark brown, the abdomen fulvous yellow, first tergite with a brown transverse preapical streak, the next four tergites each with paired broad, deep black subquadrate marks on each side that nearly fuse centrally, the next tergite with a large black spot covering the apical half or more, and the hypopygium, except the apical process, also black; wings hyaline; legs yellow.

Length, 1.75 mm.

Head black, the palpi fulvous yellow, third antennal segment brown; all bristles and hairs black. Frons shining, with slight pruinosity, the width at vertex equal to the length in centre, the length on sides slightly less than in centre, surface hairs extremely fine and short, bristles all strong, the central pair on front margin rather close together, the two series of four in almost straight transverse series; edge of vertex sharp, the four bristles strong, the incurved one behind the outer one on each side short but strong; no punctures on frons, and no incised line in centre. Third antennal segment not obviously pyriform, the bulk about equal to that of palpus, the arista nearer base than apex; palpi each with three short but strong black bristles along lower edge of apical third; one bristle close to eye at level of lower edge of third antennal segment, and two near posterior angle of gena. Aristae densely short pubescent.

Thorax fulvous yellow, the entire dorsum including the scutellum dark brown to fuscous, pleura entirely yellow. The pleural armature as usual, but on the lower edge of the propleura there are only three short bristles. Scutellum about three times as wide as its length in centre, with one strong bristle near each lateral angle of hind margin and a very small setulose hair immediately in front of each. The mesonotum with the usual bristles along each lateral edge and four in front of the scutellum, the two in centre much the shorter.

Legs normal, the fore tibia with four short bristles on the anterodorsal surface from before middle to apex; mid tibia with the usual two bristles at base and the apical half or more of the anterodorsal surface with laminately arranged series of microsetulae; hind femur without any noticeable armature or hairing; hind tibia without distinct bristles.

Wings yellowish hyaline, veins brown. Costa extending to middle, costal fringe very short, divisions of costa as in Fig. 1.

Abdomen stout, tapered to apex, flattened above, the tergites dull on the black parts, second about as long as the next two combined, sixth hardly as long as the fourth and fifth combined. Hypopygium quite large, curved forward against venter, the apical lamellae well developed.

Halteres yellow.

Holotype, Savaii : Safune, 12.v.1924 (Bryan).

I have carefully compared this species with the exhaustive description of *dohrni*, Dahl, by Schmitz and have decided that the much smaller anterior bristles on the scutellum, and the different comparative lengths of the second and third costal divisions, as well as some minor characters, justify me in considering it distinct.



TEXT-FIG. 1.—*Diploneura instabilis*, basal half of costa of wing showing veins 1 to 3.

A female before me is much paler in colour, but this may be owing to its having been preserved in alcohol. The antennae are smaller, the palpi longer and rather slender, and the proboscis heavily chitinized, projecting straight in front, with the apical section about as long as the height of the head. The basal pair of scutellar bristles is fully half as long as the apical pair. The third section of the costa is a little longer than in the male, but it is distinctly less than half as long as the second. In the type of *dohrni* the third section is slightly over half as long as the second (5 : 9) according to Schmitz.

Upolu : 6.iii.1924, from dead molluscs, Buxton and Hopkins.

'*Megaselia* Lioy.

This generic name supplants *Aphiochaeta*, Brues, which has been in general use for about twenty years. It is by far the most numerous genus in the family, though recently an attempt has been made to divide it into subgenera, to which it is probable that full generic rank will eventually be accorded. There are a number of quite well differentiated species in the material now before me which may be distinguished as in the following key.

KEY TO THE SPECIES.

1. Costa extending to about one-third of the wing length, width of cell between the first two thin veins of the field measured along the third vein not over half as great as width of the same cell, below apex of the fourth vein (Fig. 2) ; scutellum with four bristles, the basal pair not very much shorter than the apical

- pair; mesopleura without setulae on upper posterior angle; upper pair of proclinate supra-antennal bristles hardly more widely separated than the lower pair *insulana*, Brues.
- Costa longer, rarely falling short of middle of wing, the width of the cell between the first two thin veins of the field measured along the third vein much more than half as great as width of same cell below apex of fourth vein; other characters not as above 2
2. Mesopleura with some setulae on the upper posterior angle; costa falling short of middle of wing, the costal vein thicker than usual, the divisions as in Fig. 5; a small dark brown species, with the head and dorsum of abdomen black *pacifica*, n. sp.
- Mesopleura entirely bare; costa not as above 3
3. Scutellum with four bristles, the basal pair much smaller than the apical one, especially in the male, in which they are reduced to short setulae; no bristle at base of second wing vein on upper side 4
- Scutellum with only two distinct bristles, no setula in front of either 5
4. Frons in female clear orange-yellow, in male usually slightly darkened above, the upper pair of postantennal bristles separated by more than twice as great a distance as either is from the inner bristle of the anterior reclinate series; fourth vein of the wing leaving third at base of the fork *scalaris* Loew.
- Frons in both sexes black or fuscous, usually yellowish on anterior margin, the upper pair of postantennal bristles separated by less than twice the distance of either from the inner bristle of the anterior reclinate series; fourth wing vein leaving third beyond the base of the fork. *safuneae*, n. sp.
5. Fringe of the costa not longer than the diameter of the costal vein, subcostal vein exceptionally distinct, complete, connecting with first (Fig. 3); hind tibia with the posterodorsal series of setulae reduced to very fine and closely placed hairs, the apical fourth or less of the posterior surface with the microscopic hairs arranged in laminate manner (Fig. 4); yellow species, with the frons and dorsum of abdomen largely or entirely black; second wing vein with no setula at base above; halteres yellow *perturbans*, n. sp.
- Fringe of the costa distinctly longer than the diameter of the costal vein; subcostal vein faint or lacking; hind tibia with the posterodorsal series of setulae well developed, the setulae black and well separated (Fig. 7) 6
6. A distinct setula or short bristle at base of second wing vein on upper side; all of thorax and abdomen black; longest costal setulae of fringe as long as the branch of second vein (Fig. 6) *basiseta*, n. sp.
- No setula at base of second vein above; thorax and abdomen not entirely black 7
7. Abdomen brownish black, the second and sixth tergites fulvous yellow *sauteri*, Brues.
- Abdomen with the dorsum entirely dull brownish black *atridorsata*, n. sp.

2. *Megaselia insulana* Brues.

A small species with much the same appearance and characters as *divergens*, Malloch, a North American species, but paler in colour, and with four well-developed scutellar bristles, a character that distinguishes it from the European *pygmaea*, Zetterstedt, recorded from Formosa by Brues.

I have figured the costal characters as a guide to the recognition of the species, no other from Samoa being at all similar in this respect (Fig. 2).

The frons is black, slightly shining, with the usual bristles; the upper pair of postantennals is separated by about the distance of either from the inner bristle of the anterior reclinate series and a little wider than the lower pair, which latter are almost as strong as the upper. The hind tibia has the posterodorsal series of bristles distinct but not complete, fading out before attaining the apex. The halteres are dull yellow.



TEXT-FIG. 2. — *Megaselia insulana*, costa of wing.

Upolu: Apia, 4.iv.1924, reared from larvae in fungi, Buxton and Hopkins.

There are many species of this genus that feed in fungi, especially *Agaricus* and closely related genera, a few being injurious in mushroom beds. In Scotland I have taken large numbers of specimens in the autumn on the undersides of these fungi, especially in woodlands amongst sparse growths of large trees.

A number of specimens in alcohol from Apia are slightly larger and paler than the series reared from fungi, but this is no doubt due to the preservative. This second series was reared from the gill chambers of a land crab (number 681 B, Buxton and Hopkins *).

* Gill chambers of live land crabs (*Cardiosoma carnifex* Herbst. det. Calman) frequently contain larvae of a Dipteron. Most crabs contain a few, an occasional crab as many as 50. We tried repeatedly and unsuccessfully to breed the fly. The larvae suggest an insect nearly as large as *Musca*: they are unlike those figured by Keilin, and regarded by him as probably Ephydrid (*Ann. Mag. Nat. Hist.* ser. 9, vol. 8, p. 601, Dec. 1921). It seems probable that the *Megaselia* and the *Puliciphora* (p. 339) laid eggs in the material while it was being dissected, and I do not think that they occur in the gills of live crabs.—P. A. BUXTON.

3. *Megaselia scalaris* (Loew).

1856. *Phora scalaris*, Loew, *Berl. Ent. Zeitschr.*, 100.
1907. *Phora xanthina*, Speiser, *Berl. Ent. Zeitschr.*, 52, 148.
1911. *Aphiochaeta circumsetosa*, de Meijere, *Tijd. v. Ent.*, 54, 348.
1912. *Aphiochaeta ferruginea*, Brunetti, *Rec. Ind. Mus.*, 7, 83-86.
1915. *Aphiochaeta repicta*, Schmitz, *Jaarb. Natuurh. Genoot. Limburg*, 1914, 108.

I am giving the full synonymy of this species as known to me, all of which has already been published by Schmitz, except to link up the oldest name by Loew. I arrived at this synonymy several years ago while at the University of Illinois when specimens were brought to me that had been reared from milk, and it appeared possible that they might be occasionally responsible for myiasis in man. In going over the recorded habits of the species I found that it had been so recorded by Brunetti from India. Many of the specimens that I had previously examined had been reared from molluscs found in the West Indies, large numbers having been found in the United States National Museum collections. The fact that the species has the habit of feeding in sea-shells in the tropical part of North America probably explains why it is so widely distributed, occurring as it does in the New World, India, Africa, and very probably in many of the Pacific Islands in addition to Samoa. It occurs in the United States as far north as Washington.

As amongst the papers recorded above there are many very good descriptions of the species it appears unnecessary to go into details here.

Upolu : Apia, a series bred with *Scholastes* from green coconuts which had been opened for drinking, and then become rotten, Buxton and Hopkins.

4. *Megaselia safuneae*, n. sp.

Rather closely related to *scalaris*, but with the frons darker and with a slight but constant difference in the arrangement of the anterior bristling, and the wing venation differing somewhat.

Length, 1.5-2 mm.

Head black, anterior margin of the frons yellowish, antennae brown, palpi testaceous yellow. Upper pair of postantennal bristles closer than in *scalaris*, the lower pair not as widely separated as the upper and well below them. Surface hairs numerous and rather distinct. In other respects similar to *scalaris*, but there are fewer setulae in front of eye below level of antennae (4 or 5).

Thorax as in *scalaris*, fulvous yellow, with black hairs and bristles; scutellum with four bristles in female, the basal pair shorter than the apical, and with only two well-developed bristles in the male, the basal pair either represented by a minute hair or lacking.

Legs yellow, apices of the hind femora usually slightly darkened. Hind tibia with the posterodorsal setulae distinct.

Wings hyaline. Costa to a little beyond middle of wing, first section fully as long as next two combined, third not half as long as second; hairs of fringe at least as long as free part of second vein.

Abdomen fulvous yellow, dark brown above.

Halteres brownish yellow.

Holotype ♀, allotype, and one female and one male paratype, Savaii: Safune, 22.v.1924 (Bryan).

5. *Megaselia perturbans*, n. sp.

General colour similar to the preceding species, differing essentially in the characters of the wing and hind tibiae.

Length, 1.5 mm.

Female.—*Head* black, antennae brown, palpi fulvous yellow. Frons almost as in *safuneae*.

Thorax brownish yellow, pleurae paler. Scutellum with only two bristles.



TEXT-FIG. 3.—*Megaselia perturbans*, costa of wing.



TEXT-FIG. 4.—*Megaselia perturbans*, hind tibia from behind.

Legs yellow, the hind tibiae with the posterodorsal setulae undeveloped (Fig. 4), and the hairs on posterior surface lamellate in part.

Wings hyaline, veins brownish yellow. Costa to slightly beyond middle, the fringe very short, divisions as Fig. 3.

Halteres yellow.

Holotype, Tutuila: Leone Road, 19.ii.1924 (Bryan).

A second female specimen is damaged but apparently belongs here.

Savaii: Safune, 22.v.1924 (Bryan).

6. *Megaselia pacifica*, n. sp.

A small dark brown species, with blackish brown abdomen, yellowish pleura, legs, and palpi. Differing noticeably from all the species from Samoa in the venation of the costal region (Fig. 5).



TEXT-FIG. 5.—*Megaselia pacifica*,
costa of wing.

Length, 1.25 mm.

Holotype ♀, Savaii: Safune, 13.v.1924 (Bryan).

7. *Megaselia basiseta*, n. sp.

The only species in the collection in which the head, thorax, and abdomen are black and the mesopleura bare. Further distinguished by the presence of a setulose hair at the base of the second wing vein on its upper surface.

Length, 1–1.5 mm.

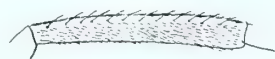
Male.—*Head* black, antennae fuscous, palpi testaceous yellow. Frons subquadrate, with the usual bristles, four postantennals present; the single specimen is so much covered with the mounting medium that it is impossible to accurately determine the exact arrangement of the bristles.

Thorax black, shining, the pleura becoming brownish below. Mesopleura bare; scutellum with two bristles.

Legs brownish yellow, the fore pair, and especially the coxae palest. Fore



TEXT-FIG. 6.—*Megaselia basiseta*,
costa of wing.



TEXT-FIG. 7.—*Megaselia basiseta*, hind tibia.

tarsi slender; hind tibia with about ten short but distinct posterodorsal setulae (Fig. 7).

Wings greyish hyaline, veins fuscous. Costa to middle of wing, the fringe long, divisions as in Fig. 6; the setula at base of second vein rather short.

Abdomen black. Second tergite not noticeably elongated and without lateral bristles; apical lamella yellow, short, and without outstanding bristles.

Halteres brown.

Female.—Similar to the male in general characters, but larger and stouter, with the legs darker and the halteres paler.

Holotype ♀, and allotype, Savaii : Safune, 23.v.1924 (Bryan).

I have selected the female as the holotype because it is in better condition than the male.

8. *Megaselia sauteri* Brues.

This species is readily distinguished from the others in the collection by the characters listed in the foregoing key. The strikingly bicoloured abdomen is the outstanding feature.

Tau, Manua, 20.ii.1926 (Judd).

I have seen specimens from Japan and Formosa, the latter being the type locality.

9. *Megaselia atridorsata*, n. sp.

Very similar to the preceding species, but with the abdomen entirely dull brownish black.

Length, 1.75 mm.

Female.—*Frons* black, slightly shining, a little wider than long, with the usual bristles, the upper postantennals about three times as long as the lower, and more widely separated, the distance between them almost twice as great as that of either from the inner bristle of the anterior reclinate series, the latter well below the outer one, which is close against the eye margin. Antennae brown, paler at bases, the third segment almost globular. Face, palpi, and proboscis fulvous yellow. Palpi not larger than normal. Three short fine hairs on each side of face.

Thorax brownish yellow, upper part of pleura and disc of mesonotum much darker, brown to fuscous. Propleura with two short setulae on lower margin; scutellum with two strong bristles; mesopleura bare.

Legs honey-yellow, apices of hind femora hardly darker. Fore tarsi slender, hind femur with a fringe of short hairs on basal half of ventral surface; hind tibia with about a dozen setulae on the posterodorsal surface.

Wings hyaline, veins brown, the costal region as in *perturbans*.

Abdomen entirely brownish black, the dorsum very slightly shiny.

Knobs of halteres fuscous.

Holotype, Upolu : Malololelei, 2,000 feet, 26.xi.1924, Buxton and Hopkins.

10. *Megaselia aneura*, n. sp.

I am describing briefly a remarkable specimen which may be merely aberrant in its most striking character, the lack of the free part of the second wing vein. This feature is usually of generic significance, but the other characters of the species are so clearly those of *Megaselia* that I am placing it here.

Length, 1.5 mm.

Male.—*Head* black, antennae fuscous, paler at bases, palpi whitish yellow, proboscis yellow. Arrangement of bristles on the frons almost as in *atridorsata*. Palpi slightly dilated, each with about six black bristles along lower margin.

Thorax black, becoming brownish yellow below. Scutellum with two bristles; mesopleura with some short stiff hairs on upper posterior angle.

Legs dull yellow, apices of hind femora slightly darkened. Fore tarsi slightly thickened and hardly longer than fore tibia; hind femur with several rather long hairs on basal half of ventral surface; hind tibia with about ten short fine setulae on the posterodorsal surface.

Wings hyaline, veins fuscous. Costa to middle of wing, not as thick as second vein, the fringe moderately long, first section about one-fifth longer than the second, the free part of second vein lacking.

Abdomen black, apical lamella yellowish. Second tergite but slightly longer than third, not exceptionally bristled on sides; two short apical setulae on the lamella.

Halteres dull yellow.

Holotype, Upolu: Malololelei, 2,000 feet, 25.xi.1924, Buxton and Hopkins.

The setulose upper posterior angle of the mesopleura distinguishes this species from any but *pacifica* in the present collection, and from the latter it is very readily distinguished by the much thinner costal vein.

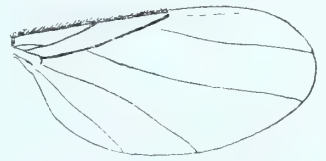
Puliciphora Dahl.

This genus, as far as known, has the females without wings or halteres, and the males fully winged and with halteres. The wing of the male lacks the separate apical section of the second vein, *i.e.* the third vein is accepted as unforked. As far as I know the species are not specialized in their larval food habits, all known to me having been found associated with decaying animal or vegetable matter. The present collection contains specimens reared from a

variety of pabula, particularly from dead organisms of several types. Other genera, except *Chonocephalus*, in which the wings are either lacking or much reduced are more generally found in the nests of ants or termites. One North American species I described in 1913 was found active on ice in January 1874, but most records of their occurrence are in summer.

11. *Puliciphora lucifera* Dahl.

This species will no doubt be found of general occurrence in the Pacific Islands. It was described from the Bismark Archipelago, and has been recorded by Brues from Fiji. Possibly the small size of the insect, under 1 mm. in length, prevents its being found in collections from other portions of this region. There is a very full description of the type material published by Schmitz in 1929,* so that it is not necessary to deal fully with the species herein. I have, however, figured the wing of the male to show the distinctions between this genus and *Chonocephalus*. The presence of the humeral cross vein and the subcostal vein as well as the complete first vein readily distinguish the genus (Fig. 8).



TEXT-FIG. 8.—*Puliciphora lucifera*, wing.

Upolu: Apia, 1 ♂ in very fine condition, February 1925, fowl dung, a series from gill chambers of a land crab,† July 1924, another from a dead longicorn beetle, 1.iii.1924, and one from dead molluscs, Buxton and Hopkins.

Chonocephalus Wandolleck.

This genus is very similar to the preceding one, but there are no proclinate anterior frontal bristles present, and the humeral cross vein and subcostal vein are undeveloped, while the first vein is evanescent apically.

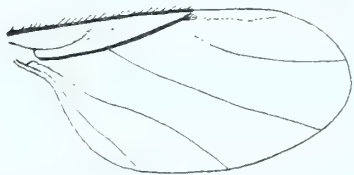
12. *Chonocephalus dorsalis* Wandolleck.

This is the genotype. Only three males are in the collection, and they were reared from fowl dung along with the first listed male of the preceding

* "Konowia," 8 (2), 114.

† See footnote, p. 333.

species. I present a figure of the wing to show the outstanding venational features (Fig. 9).



TEST-FIG. 9.—*Chonocephalus dorsalis*, wing.

Upolu : Apia, February 1925, from fowl dung, Buxton and Hopkins.

Recorded by Brues from Fiji, and probably occurring along with *P. lucifera* over the Pacific Island region.

AGROMYZIDAE.

This family is very widely distributed, occurring in all faunal regions, but there are comparatively few species recorded from the Pacific Islands, and only three are contained in the collection now before me. Of these, two belong to the subgenus *Melanagromyza*, Hendel, of *Agromyza*, and the other is a rather aberrant species of the genus *Phytomyza*.

Bezzi has recorded eight species from Fiji.

All the species in this collection belong to groups that have phytophagous larvae that feed, as far as known, in the stems or leaves of plants.

Agromyza Fallén.

There are but two species of this genus in the collection, both of them belonging to the group with black knobs to the halteres and the vibrissal angle not produced, which group has been given the name *Melanagromyza* by Hendel. I believe it is improper to give the group full generic rank, and accept it as a subgenus.

13. *Agromyza* (*Melanagromyza*) *phaseoli* Coquillett.

A small black species with slight metallic blue tinge on the abdomen, the squamae white, with yellowish fringe, and but two pairs of postsutural dorso-centrals. The frontal triangle is shining and extends well beyond the middle of the frons.

The larvae feed in mines in the leaves of beans.

Upolu : Apia.

Recorded by Bezzi from Fiji. Originally described from Australia, and probably widely distributed in this region.

Agromyza (*Melanagromyza*), sp.

Three specimens of a species that runs down to *prolifera*, Malloch, in my paper on the Formosan species of this genus,* but does not agree in all respects with the description; the species may be undescribed, but I do not care to describe it on the basis of the present material.

Tutuila and Savaii.

Phytomyza Fallén.

This genus is distinguished from *Agromyza*, by the lack of the outer cross vein of the wing and the reduction of the fourth and fifth veins to mere traces (Fig. 10, *a*).

Some of the species are very widely distributed, but their similarity in characters may to some extent be responsible for faulty records of occurrence.

14. *Phytomyza spicata* Malloch.

I refer to this Formosan species a single male specimen that agrees well with the description, the entire insect being black, slightly shining, the abdomen most distinctly so, and the squamae and halteres yellow. The insect very closely resembles the European *atra*, Meigen, but the anterior pair of postsutural dorsocentral bristles is very much smaller than the second pair and much closer to these than in any European examples before us. I stated in my original description that the intradorsocentral hairs were in about eight series, but in the specimen before me from Samoa the hairs are in four quite regular series.

Bezzi recorded *atra* from Fiji, but I believe he had the present form before him. He placed it in *Pseudonapomyza*, Hendel, following the author of that genus, but the only character that appears to justify the removal of the species from *Phytomyza* is the acutely pointed upper apical angle of the third antennal segment (Fig. 10, *b*), the venation of the wings being similar in the two concepts despite Hendel's statement to the contrary. I described two species of the group from North America in 1913, and Frost has placed them as synonyms of *acuticornis*, Loew. I have again examined my type specimens and maintain that



TEXT-FIG. 10.—*Phytomyza spicata*, Malloch, wing (*a*) and antenna (*b*).

* *Ann. Mus. Nat. Hungar.*, 12, 326 (1914).

they are distinct. Frost has described the species in which the aristae are yellow-white near their bases, and the tarsi are brownish yellow, in his paper in 1923,* but this characterization refers to *lacteipennis*, Malloch, and not to *nitidula*, Malloch. In addition to these two characters *lacteipennis* has the thorax with distinct pale grey dusting which is lacking in the other species, and the yellowish white bases to the wing veins are very strikingly different from the fuscous bases to the veins in *nitidula*. Hendel has definitely synonymized *acuticornis* with *atra*, but questions the association of *spicata* with that species.† The two North American species are quite distinct, and though the one with entirely black legs and aristae is in every respect similar to *atra* a careful examination of the hypopygial and larval characters ought to be made before they are accepted as identical. In any event, all three have the three pairs of postsutural dorsocentral bristles well developed, and the anterior pair is well in front of the second pair, so that the one from Samoa is readily distinguishable from them.

Bezzi records his specimen listed as *atra* as having been reared from larvae mining at tip of young sugar-cane, and mining in leaves of corn (maize), while he states that larvae of *atra* are known as mining chiefly in Gramineae. I do not know where his information was derived from, as Frost records the species as feeding in Labiatae, Leguminosae, and Umbelliferae.

Upolu : Apia, 12.ix.1923, Swezey and Wilder.

MICROPEZIDAE.

This family contains species of slender to very slender form, with long and usually slender legs, the wings with the first posterior cell narrowed at apex, and the vibrissae lacking. Despite the elongate mid and hind legs the tarsi on these are rarely over one-third as long as their tibiae. The only group that may be confused with this one is Neriidae, which has usually been accepted as merely a subfamily. In it the arista is apical instead of dorsal, and the fore coxae are longer, inserted nearer to the mid pair so that when pressed backward they almost or quite touch these; in the Micropezidae the fore coxae are shorter, more distantly situated from the mid pair, which they fall short of attaining when pressed backward.

* *Corn. Univ. Agr. Exper. Sta. Mem.* 78, 62.

† *Arch. für Naturges.*, 84, A, 7, 1918 (1920), 115.

Little is known of the early stages of the family, though I have seen specimens that were reared from lily bulbs, and they are very probably feeders on roots or rotting vegetation.

The species are found throughout the warmer parts of both hemispheres, but are absent from Patagonia and New Zealand. Some species occur as far north as Alaska and the Canadian Northwest. Bezzi has recorded no Micropezidae and one species of Neriidae, *Telostylinus lineolatus*, Wiedemann, from the Fiji Islands. In the Samoan material there are two species of Micropezidae which belong to different genera.

Grammicomyia Bigot.

This genus, as restricted by Enderlein in 1922,* would hardly receive the species now before us, but on the basis of the characters of the only species available to me that has already been described, *Calobata territa*, Osten Sacken, I consider it wise to place it herein rather than to erect another genus for its reception. Enderlein had not seen *territa* when he wrote his paper, and only provisionally referred it to *Grammicomyia*. I make a comparison of it with the new species below.

Czerny in 1932† proposed the new genus *Sphaericocephala* for the reception of the species Enderlein placed in this genus, leaving only *testacea*, Bigot, and *vittipennis*, de Meijere, in *Grammicomyia*. If he is correct then the new species described below will fall in that genus as restricted by him, and *territa* would probably fall in his new genus.

15. *Grammicomyia inermipes*, n. sp.

A brownish yellow species, very similar in general colour to *territa*, with the apices of all femora rather narrowly black or dark brown, and the wings without dark markings. The bases of the hind tibiae are not conspicuously blackened, and the mesonotum has traces of three dark vittae in most specimens, while the dorsum of the abdomen is dark brown, with the apices of the tergites usually showing yellowish.

The species departs notably from Enderlein's diagnosis given in his generic key in that the second wing vein ends in the costa at about as far from the apex

* *Arch. für. Naturges.*, 88, A, 173.

† *Stett. Ent. Zeit.*, 93.

of the wing as the length of the ultimate section of the fourth vein. Despite this I consider the other characters are of more importance as generic criteria, and use them to place the species in this genus. The head is not longer than high, with the interfrontalia depressed and dull, the frontal orbits dull and linear in front, becoming gradually wider to vertex and glossy on posterior two-thirds; ocelli situated slightly in front of vertex, the latter not depressed in centre, the bristles six in number, the outer one placed rather low, the postverticals slightly incurved; each orbit with two short bristles on anterior half instead of three as in *territa*, where the upper one is much stronger than the two in front and the latter are much closer placed. Antennae short, second segment with a moderately long fine hair below at apex that is much shorter than the one in *territa*; arista plumose, the hairs about as long as width of third antennal segment and much longer than in *territa*. Face with a sharp central carina that is not sulcate as in *territa*, the prelabrum much protruded, in most cases almost conically so, and not a mere linear strip as in the other species; palpi narrow, of moderate length.

Thorax not as much narrowed in front as in *territa*, with the same bristling except that there are but two posterior bristles on the sternopleura instead of three or four. The small convexity below the scutellum is the same as in that species.

Legs slender, the fore femur in neither sex with short closely placed triserial bristles such as are present in the male of *territa*.

Wings brownish hyaline, subcosta lying close to first vein, the latter ending a little over midway from base of wing to level of inner cross vein.

Abdomen about as long as head and thorax combined, the fifth sternite of the male not bifid and prominently exposed as it is in *territa*.

Length, 7.5–9 mm.

Holotype ♂ and 1 ♂ and 1 ♀ paratype, Upolu: Malololelei, 2,000 feet, xii.1925 (Buxton and Hopkins). Allotype and two paratypes, Savaii: Salailua, and Safune, 1 paratype ♀, Tutuila.

Calobata Meigen.

— This heterogenous concept contains a large number of very dissimilar species in the two Hemispheres, and it appears to me highly improbable that all of them can be considered congeneric in view of the rather trivial characters

that are utilized for generic segregations in the family. I believe that the North American species are more closely related to the genotype *cothurnata*, Panzer, than either is to the species now before me from Samoa. In fact, there is much more resemblance between some of the species placed in the genus *Rainieria*, Rondani (= *Tanypoda*, Rondani), and this species than with the more typical forms of *Calobata*. In Enderlein's generic key in the paper above mentioned the two genera separate at the couplet in which the bare or pubescent nature of the aristae is utilized as the distinguishing character; in *Rainieria* there being no pubescence while in *Calobata* there is pubescence. This is not a very satisfactory character, for in the Samoan species the pubescence is seen only under a high-power lens (ca. $\times 34$), though in the more typical forms of *Calobata* it is much more readily seen. An important distinction between the typical forms of the last-named genus and those of *Rainieria* consists of the presence of a



TEXT-FIG. 11.—*Calobata palipes*, Loew, anterior extremity of thorax in profile, left side.



TEXT-FIG. 12.—*Neocalobata deferens*, anterior extremity of thorax in profile, left side.

narrow but quite evident convexity across the upper edge of the postnotum immediately below the scutellum; this is entirely lacking in the Samoan species under discussion. Also the anterior outline of the thorax in profile is different (Figs. 11 and 12), that of the typical forms being slightly overhanging, and the humeral angles distinct, while in the other the anterior edge of the pronotum is vertical and the humeral angles are not evident. In *Rainieria* the pronotum in the only species before me is less elevated in front, but is more like the Samoan than the other species.

It appears pertinent to note here that in Curran's "North American Diptera" which appeared a few months ago, the Micropezidae are separated from the Calobatidae in the generic key by the character of the haired propleura in the former, the other group being listed as having the propleura bare. Unfortunately many genera of the Calobatidae have minute hairs on the propleura, including one North American species of widespread distribution. The lack of

the cross vein separating the posterior basal and discal cells of the wing appears to me to be the only character of value for the separation, but I deem it insufficient basis for family distinction and agree with Enderlein in his assignment of subfamily rank to the group. It may also be noted in this connection that Curran figures the wing of *Metopobrachia*, Enderlein, with this cross vein present which in my opinion, if correct, would bar it from Micropezinae.

I propose to recognize the Samoan species as belonging to a subgenus of *Calobata*, though it is highly probable that further work may establish it as a valid genus. The characters are those cited above, and in addition: the more oblique vein closing the anal vein, with its continuation to the wing margin, the much shorter tarsi, and the much less complicated processes of the fifth abdominal sternite of the male, these being of the same type as in *Rainieria*, consisting of two slender processes. The tibiae in typical *Calobata* are cylindrical, while in the Samoan species they have two linear grooves or channels, one on the anterior and the other on the posterior surface near the dorsal edge on almost their entire extent.

Subgenus *Neocalobata*, novum.

Subgenotype, the following new species.

16. *Calobata* (*Neocalobata*) *deferens*, n. sp.

♂, ♀.—Similar in most respects to *Calobata confinis*, Walker, and related forms in which the general colour is bluish black, with the legs black, the mid and hind femora at extreme bases, and sometimes the fore pair also, yellow, the mid and hind femora usually brownish near apices, and the fore tarsi black on the basal half of the metatarsus and pure white beyond that.

Head black, with a blue tinge, the frons glossy except on a large central elongate velvety black spot that extends from anterior ocellus to near anterior margin and occupies more than half the frontal width, the anterior margin sometimes reddish, the area round the ocelli brownish to greyish dusted, the vertex behind the ocelli velvety black; face shiny black except narrowly along each side and in the lower half of each antennal fovea, where it is silvery white dusted; antennae orange-yellow to brownish yellow, the aristae pale at bases, darkened apically; prelabrum shining black; palpi fuscous, sometimes yellowish basally. Frons longer than wide, the black spot slightly raised, the ocelli near

vertex and very close together, the vertex depressed in centre behind the ocelli, the verticals well developed, the outer one much below level of the inner, post-verticals undeveloped, each orbit with two fine bristles, the upper one slightly above middle, the under one below middle. Face with a rather broad central elevation that is flattened or slightly sulcate in centre; prelabrum large and broad, distinctly protruded; antennae moderate in size, third segment not twice as long as wide, rounded at apex; arista with short hairs on basal half that are hardly longer than the basal diameter; palpi strap-like and of moderate length.

Thorax distinctly blue tinged, the mesonotum appearing dull black on each side at suture in certain lights, and greenish on each side behind the suture, the paler parts with very faint whitish dust, the sternopleura more distinctly white dusted. Mesonotum attenuated anteriorly, the humeral callosities undeveloped, the centre in front of suture slightly raised, the suture quite distinct and practically complete, the length in front of it a little greater than that behind it; scutellum short and rounded in outline. Notopleurals 2, supra-alar 1, postalars 2, scutellars 2, sternopleura with a fan-like arrangement of bristles and hairs on its posterior margin.

Legs brownish black, the fore femora usually black, but in some specimens yellowish at bases, the mid and hind pairs usually narrowly yellow at bases, and brownish on apical third or less, the tibiae varying from brown to black, the fore pair always darkest, the fore tarsi except the basal half of the basal segment pure white, the mid and hind pairs brownish yellow. Fore tarsi over half as long as fore tibiae, mid and hind pairs not over one-third as long as their tarsi; no bristles on the femora, the fore tibiae slightly thicker than the other pairs and without setulae, the mid pair with a series of very short setulae on the posterodorsal surface that become closer apically, the hind tibiae with a similar series of setulae on the posterodorsal and a more widely spaced series on the anterodorsal surface.

Wings greyish hyaline, with a dark cloud of variable intensity just in front of the outer cross vein and another similar cloud from just beyond it to apex, both extending entirely across the wing, and generally more or less fused behind. Inner cross vein at middle of discal cell, the last three sections of fourth vein almost equal in length; first posterior cell narrowly open, ending in almost the exact wing tip; basal half of the venation as in Fig. 13.

Abdomen blue black, shining, with blackish and bluish reflections according

to the angle from which it is viewed, the membrane dark brown, with a small pale spot on each side near base and a large one on each side apically in the male. Fifth sternite of male with a pair of long slightly curved slender processes



TEXT-FIG. 13.—*Neocalobata deferens*, basal half of wing.

which are about as long as the thick basal section of the sternite, the inner margins of each studded with microscopic spinules or warts, and the remainder with fine short hairs; penis of the male consisting of a long hair-like process that is about as long as the abdomen.

Squamae dark brown, knobs of halteres fuscous.

Length, 10–13 mm.

Holotype ♂, and allotype, Upolu : Malololelei, 2,000 feet, xii.1925, and xi.1925 (Buxton and Hopkins).

Paratypes, Upolu : Vailima, Apia ;

Tutuila : Amauli : Pago Pago ;

Savaii : Salailua.

A very large series of this species indicates that it must be very common and widely distributed. It has in all probability been already described, but it is impossible for me definitely to identify it from existing descriptions so I describe it as new.

TACHINIDAE.

TRIBE RUTILIINI.

Only the genus *Rutilia* is represented in the collection. The tribe is almost exclusively Australasian, one or two species extending into the Malayan region and one being found in China, but the great bulk of the species is found in Australia. No species are known from New Zealand, and there are no near relatives found in Africa or the New World. Bezzi has described one species from Fiji, but as a rule the representatives in the Pacific Islands outside of New Guinea are very few.

I have carefully compared the Samoan species with those available to me from other localities and with descriptions of already described species and believe they are new to science.

These species will very probably be found to parasitize the larvae of large beetles.

SPECIFIC SYNOPSES.

- A. Dark metallic blue-green species, abdomen and thorax concolorous, the former nowhere semipellucid; wings slightly smoky, with the veins all rather conspicuously margined with fuscous; squamae brown, fuscous on margins; thoracic and abdominal hairs all black *nigrihirta*, n. sp.
- AA. Much paler species, the mesonotum more or less definitely metallic green with pale dusting, and the greater portion of the abdomen semipellucid testaceous to tawny yellow; wings hyaline, with the usual blackish spot near base, the veins brown and at most yellowish margined; squamae yellowish white with darker margins; at least the pleural and some of the abdominal hairs yellow *savaiiensis*, n. sp.

17. *Rutilia (Rutilia) nigrihirta*, n. sp.

Male.—*Head* black, the face more brownish, the epistome distinctly so, the interfrontalia brownish black, other parts with pale grey dusting; antennae fuscous, base of third segment brownish yellow; palpi brownish yellow. Beard whitish yellow, all the other hairs fuscous. Frons at vertex slightly wider than third antennal segment, gradually widened to antennae, the orbits with rather dense fine hairs which are continued downward on the parafacials to or beyond apex of second antennal segment, the inner margin of each orbit with some fine bristles anteriorly; ocellars undeveloped; one pair of rather short verticals; face normal, the carina about as wide as parafacial, with a slight central raised line; antennae normal, the third segment not as long as distance from its apex to the epistome; arista subnude; palpi normal in length.

Thorax dark metallic blue-green, the pleura almost black, the mesonotum with slight grey dusting and faint traces of four dark vittae anteriorly; all the hairs black. Mesonotal hairs short and rather dense; presutural area with one pair of very fine acrostichals and about four pairs of similar dorsocentrals, the postsutural dorsocentrals, except the strong pair on hind margin, obsolete, four strong bristles in a transverse series on hind margin between the pair of dorsocentrals; postalars three; one sternopleural; prosternum bare; scutellum subtriangular and flattened above, with fourteen marginal bristles, the apical pair lower and shorter than the next adjacent pair.

Legs black, the fore and mid pairs appearing more brownish. Mid and hind coxae with several strong, straight backwardly directed bristles below;

hind femur with a few short bristles on basal half or less of the anteroventral surface and no well-developed bristles beyond them, and two or three strong bristles near base on the posteroventral surface; mid tibia with a short ventral submedian bristle; hind tibia with the usual closely set fringe of setulae on the entire extent of the anterodorsal surface in which there is no outstanding single bristle, and a very fine short posterodorsal bristle beyond middle.

Wings as described in the synopsis, the black spot near base very conspicuous. Second costal section about half as long as third.

Abdomen blue-green, metallic, first visible tergite, apices of the others, and a dorsocentral vitta dark blue. All abdominal hairs black. Second visible tergite without apical central bristles, third with a complete apical series, fourth with the usual discal series and numerous bristly hairs at apex, the tergites all with well-developed bristles below, those nearest to lateral extremities the strongest. Fourth tergite with a deep central depression on its entire exposure.

Length, 15 mm.

Holotype, Upolu, Malololelei, 2,000 feet, 2.viii.1925 (Buxton and Hopkins).

18. *Rutilia* (*Rutilia*) *savaiiensis*, n. sp.

This is a much paler coloured species than the one described above, having in addition to the paler head, thorax, and abdomen, the legs brownish yellow to orange-yellow with the exception of the fuscous tarsi.

Male.—*Head* brown, the genae, face, and parafacials paler, with grey dust, the interfrontalia dark brown and undusted; antennae orange-yellow; aristae fuscous; hairs on frons fuscous, those on genae whitish yellow; palpi orange-yellow. Frons at vertex a little wider than third antennal segment, widened to anterior margin, with the same general form and armature as in *nigrihirta*, but the hairs cease at or slightly above level of second antennal segment. Parafacial wider than facial carina.

Thorax brownish yellow, mesonotum except the margins metallic green, with whitish grey dust and with four or six dark vittae anteriorly; the centre of mesopleura and lower part of the sternopleura infuscated; hairs on dark part of mesonotum dark, those on margins and the pleural hairs mainly brownish yellow. Armature much as in *nigrihirta*, but there are eight bristles in the transverse series near hind margin of the mesonotum, and there are four postalar

bristles. Scutellum with a coppery tinge and twelve marginal bristles. In other respects similar to *nigrihirta*.

Legs brownish yellow to orange-yellow, the tarsi fuscous. Bristling, etc., as in *nigrihirta*.

Wings as in synopsis, the basal dark mark brown and less conspicuous than in the above species, and the second costal section about one-third as long as third.

Abdomen semipellucid tawny yellow, with a dark central vitta on dorsum and the apices of the tergites more or less darkened, all tergites with rather distinct white dusting on bases. All hairs except those on fourth tergite black, this tergite with a well-developed central apical depression. The bristling as described for *nigrihirta*.

Female.

Similar to the male in general coloration, but the third antennal segment is browned apically, and the dark markings on the abdomen are more extensive.

The frons at vertex is about one-fifth of the head width, and in addition to the fine hairs seen in the male the frontal orbits have each a fine, short proclinate bristle above the middle.

The scutellum may have as many as sixteen marginal bristles. I find on each side of the prosternum, but not on the sclerotized plate, a number of fine yellow hairs.

Holotype ♂, Savaii, Fagamalo, xi.1925 (Buxton and Hopkins).

Allotype, and one male and one female paratype, Savaii, v.1924 (Bryan).

TRIBE STURMIINI.

Sturmia Robineau-Desvoidy.

There are apparently four species of this genus before me. Bezzi recorded two from Fiji, giving to them names of previously described species, but I am rather inclined to question the propriety of this course in a genus so imperfectly understood as this one, and am especially inclined to doubt the reliability of identifications of many of the old species. I therefore adopt a conservative course and prefer to describe doubtful specimens as new, rather than make errors by extending the recorded range of a species far beyond its true distribution and thus publish erroneous data on geographical occurrences. Bezzi

has recorded *inconspicua*, Meigen, from Fiji; he may be right, but the specimens before me from Samoa that come closest to the description of the European species do not fit in all respects; I therefore prefer to consider them as distinct. It is probable that his other record is correct as an Oriental species might readily extend its range over a large territory; but I have some doubt about the occurrence in isolated island groups, and would prefer to make careful comparative examinations of such material before committing myself to a definite opinion. The species now before me are very similar in most respects, but they present in the male sex certain apparently good distinguishing characters that I make use of in separating them into four distinct species as below. One additional species is from Tonga and New Britain, but it is included to make the record more complete and to provide the opportunity to give comparative data.

KEY TO THE SPECIES.

- | | | |
|--|---|----------------------------|
| 1. Parafrontals without proclinate bristles on upper half; fourth (third visible) abdominal tergite with a patch of closely placed bristly hairs on each side below the lateral curve that is usually not visible in direct dorsal view (males) | 2 | |
| — Parafrontals with two or three strong proclinate bristles on upper half; fourth abdominal tergite without such patches of hairs on sides | 6 | |
| 2. The sexual patch of setulae on fourth tergite much reduced, consisting of a few almost erect hairs and setulae near posterior lateral angle; parafacials greyish white dusted, the hairs black, rather strong, and descending below middle; third antennal segment hardly wider than parafacial, about three times as long as second and four times as long as its basal width; fore tibia with a complete series of rather irregular setulae on the anterodorsal surface, the longest of which are nearly as long as the tibial diameter (Tonga and New Britain) | | <i>imperfecta</i> , n. sp. |
| — The sexual patch much larger and consisting of dense black decumbent setulose hairs; other characters not as above in combination | 3 | |
| 3. Width of frons at vertex not as great as height of gena (<i>i.e.</i> that part of head below centre of the eye); each frontal orbit with but one reclinate upper bristle; the parafacials brassy or golden | 5 | |
| — Width of frons at vertex greater than height of gena; each frontal orbit with two reclinate upper bristles; the parafacials silvery white or yellowish grey | 4 | |
| 4. Parafacials silvery white; squamae white; sternopleurals 2+1 | | <i>upolucae</i> , n. sp. |
| — Parafacials yellowish grey; squamae brownish yellow; sternopleurals 2+2 | | <i>aequalis</i> , n. sp. |

5. Postocular orbits densely yellow dusted on their entire extent ; sexual patch on fourth abdominal tergite large, covering almost the entire side, broadly visible from above, and the hairs covering the glossy posterior margin *chryseps*, n. sp.
- Postocular orbits silvery white dusted, becoming slightly yellowish below ; sexual patch on fourth abdominal tergite narrower, less visible from above and not covering the glossy posterior margin *zebina*, Walker.
6. Each frontal orbit with two upper inner reclinate bristles ; frons slightly yellowish dusted in part, the parafacials, genae, and postocular orbits white dusted ; second visible abdominal tergite with a pair of quite strong bristles in centre of apical margin ; fore tarsus not at all dilated *upoluæ*, n. sp.
- Each frontal orbit with one upper reclinate bristle ; frontal orbits, parafacials, genae, and postocular orbits brassy yellow dusted ; second visible abdominal tergite without a pair of bristles in centre of apical margin ; fore tarsus noticeably dilated apically. { *chryseps*, n. sp.
zebina, Walker.

18A. *Sturmia imperfecta*, n. sp.

A black, slightly shining, rather densely yellowish grey dusted species, with the antennae and palpi black, the latter slightly brownish at apices, the entire dust of the head yellowish grey, the lower postocular orbits very faintly whitish. Abdomen faintly brownish red on sides, the bases of the tergites with broad fascia of yellowish grey dust. Wings pale brown from bases to apices of the basal cells, and slightly along costa to apex of second vein.

Length, 11·5 mm.

Male.—*Head* black, densely yellowish grey dusted on the frontal orbits, face, genae and postocular orbits, less densely so on occiput ; interfrontalia velvety black ; the hairs on occiput and the beard yellowish white, postocular fringe and other hairs and all the bristles black. Frons at vertex distinctly wider than greatest height of the gena ; orbits in front of ocelli narrower than interfrontalia, the latter widened to anterior margin. Postvertical and ocellar bristles short, but distinct ; upper bristles of orbits rubbed off, but the scars show that there have been two reclinate bristles on each orbit ; inner marginal bristles strong, and laterad of these a few bristles amongst the fine hairs on anterior half ; the bristles descending to level of apex of second antennal segment, the fine hairs to below middle of face. Third antennal segment rather narrow, about as wide as parafacial at centre and three times as long as second segment ; aristæ fuscous, tapered from base to near middle, subnude.

Thorax with yellowish grey dust, the mesonotum with four black vittae,

the usual dark line between the central pair not visible from behind ; scutellum yellowish at apex and the pale part with yellowish grey dust. The usual bristles present ; sternopleurals 2+1.

Legs black. Fore tibia with a complete and rather well-developed series of setulae on the anterodorsal surface. Mid tibia with a submedian ventral bristle. Hind femur with several long bristles on basal half of the anteroventral and posteroventral surfaces, and one or two near apex on the former. Hind tibia with the usual fringe on anterodorsal surface, amongst which there is one stronger bristle beyond the middle.

Wings normal, browned, as noted in the diagnosis given above.

Abdomen with the basal fasciae of yellowish grey dust occupying about one-half of the exposed surface above, the hind margins of fasciae straight. Second visible tergite with an apical central pair of well-developed bristles. Sexual patch of hairs on fourth tergite small and inconspicuous, the hairs more erect and sparser than usual.

Squamae brownish yellow. *Halteres* dark brown.

Holotype ♂, Tonga : Haapai, 13.ii.1925 (Hopkins).

Paratype ♂, N. Britain : Rabaul (F. H. Taylor).

19. *Sturmia upoluae*, n. sp.

A smaller and darker species than *imperfecta*, with the frontal orbits largely yellowish dusted, the face, genae, and postocular orbits white dusted, the thoracic dust grey, the wings hyaline, and the squamae white.

Length, 7-7.5 mm.

♂. *Head* black, with the dust on the frontal orbits brownish yellow, that on the parafacials silvery white, the dust on the remainder of face, the genae, and lower postocular orbits white, the upper orbits slightly yellowish. Structure similar to that of *imperfecta*, but the ocellar bristles are much weaker, the parafacials are less extensively haired, and the third antennal segment is wider, and about four times as long as second.

Thorax with the dust pale greyish white on pleura, more yellowish on mesonotum ; the scutellum damaged in type, but apparently not as pale at apex as in *imperfecta*. Sternopleura with 2+1 bristles.

Legs black. Armature as in *imperfecta*.

Abdomen shining black, with the base of each tergite broadly yellowish grey dusted, the sides more broadly so. Sexual patch on fourth tergite of

moderate size, round, not visible from above, consisting of densely brownish black decumbent hairs of considerable length. Second visible tergite with a pair of apical central bristles.

Squamae white. *Halteres* brown.

♀. Similar to the male in general features, the frontal orbits with the yellow dust less extensive, ceasing at some distance from the anterior extremities, the other parts white dusted. Frons at vertex wider than in the male, about as long as third antennal segment, each orbit with two inner upper reclinate and two outer proclinate bristles in addition to the anterior inner marginal bristles.

Fore tarsi not at all widened.

Holotype ♂, Upolu : Malololelei, 2,000 feet, vii.1924 (Buxton and Hopkins).

Allotype and 4 paratype ♀♀, Upolu : Apia, ix.1924, Lot 718 (Buxton and Hopkins).

Paratype ♀, Tutuila : Pago Pago, 9.vi.1923 (Bishop Museum).

I have before me a number of specimens from Rabaul, New Britain, that appear to belong to this species. There is a puparium mounted with one of these that is very distinct from that of *chryseps* in the structure of the posterior spiracles. These are distinctly elevated, with the spiracular slits upon three well-developed ridges, the two uppermost almost parallel and directed outward and slightly upward, while the other one lies beneath these and almost at right angles to them. The "button" is not raised, but is visible as a small pit between the inner extremities of the slits. The discs are separated by about half the diameter of one disc, and there is an irregular raised ridge surrounding them.

I have examined the puparium of *atropivora*, R.-D., and find that it approaches more closely to the above type than to the other, but the slits are much shorter, more nearly at the edge of the disc, and almost round.

20. *Sturmia aequalis*, n. sp.

This species has much the same coloration as *imperfecta*, but the sides of the abdomen are not as noticeably reddish, the apices of the tergites are more glossy black, the wings are hardly browned on the costa, and the sexual patch on the fourth abdominal tergite is in the form of a small round densely haired patch, the hairs being dark brown, of moderate length, and decumbent.

Length, 10 mm.

Head with the dust yellowish grey to yellow, the postocular orbits slightly brassy below. *Armature* as in *upoluæ*.

Thoracic dusting yellowish grey. *Sternopleura* with four bristles, the two upper more widely separated than the two lower, and much stronger. Apex of the scutellum brownish yellow.

Legs black.

Abdomen with the apical central pair of bristles on second visible tergite very small, but rather strong. Sexual patch on fourth tergite circular, small, not occupying over one-fourth of the ventrally exposed surface.

Squamæ brownish yellow. *Halteres* brown.

Samoa.

It may be noted here that in all three of the above species the frontal orbits each have two upper reclinate bristles, and the second abdominal tergite has a pair of apical central bristles; in the next two species dealt with there is but one upper reclinate bristle on each orbit, and there are no apical central bristles on the second visible tergite.

21. *Sturmia chryseps*, n. sp.

This species belongs to the same group as *sericariae*, *Cornalia*, or at least to that group to which the species identified by Bezzi as that belongs. I have before me a number of species belonging to the group from Malaya and find that there are apparently several very closely allied, so that I have been compelled to refrain from considering either of the two species from Samoa as identical with *sericariae*. Until some authority has carefully examined the type specimens of the older authors, it would be unwise definitely to identify those belonging to this particular group.

Length, 12–13 mm.

A black species, with the dusting on the frontal orbits, face, genae, and postocular orbits, golden-yellow; antennae and palpi black, the apices of the latter slightly yellowish. Occipital hairs yellowish white, postocular ciliae and all other hairs and bristles black. No indication of white dust on lower postocular orbits. Frons at vertex narrower than central height of gena, the latter about equal to the length of third antennal segment, the latter about three times as great as that of second segment; parafacials bare or with a few fine hairs below lower bristles, the latter about opposite level of apex of second antennal segment; width of parafacial at centre equal to that of third antennal segment;

setulae ascending to above vibrissae to about one-third the height of facial ridge.

Thorax black, with rather dense whitish grey dust, the mesonotum with the usual four black vittae; scutellum reddish at apex. Bristling as usual; sternopleura with but two bristles in three of the specimens, three in the other, the anterior lower one close to the upper and much shorter.

Legs normal, black, no stronger bristle amongst the anterodorsal series on the hind tibia.

Wings rather distinctly infuscated from base to beyond apex of first vein on costa, most broadly so basally.

Abdomen coloured as thorax, with very slight trace of reddish on sides basally, the tergites with greyish white basal fasciae, that on the fourth much narrower at sides. Sexual patch of bristly hairs large, covering most of the incurved portions and showing above in dorsal view.

Squamae yellowish white. *Halteres* brown.

The ♀ has the frons wider, with one upper reclinate and one proclinate bristle.

Holotype ♂, allotype, and two ♂ paratypes, Upolu: Aleipata, Lalomanu, x.1924 (Buxton and Hopkins).

Bred from large Sphingid pupa, found lying on surface of ground.

Mounted with the specimens there are empty puparia. These are brownish red, 11 mm. in length, 5 mm. in width at the widest point, which is about one-third from the head, and broadly rounded at both extremities. The surface is almost smooth, with some fine incised lines at the divisions between the segments, and some more definite wrinkles at the extremities. The spiracular discs are glossy black, not raised, the separation at narrowest point being about half as great as the width of one disc. The form is almost circular, with the "button" almost in the centre, and the surface divided into three subtriangular sections somewhat like a clover leaf, on the disc of which there are serpentine slits as in *Musca*.

22. *Sturmia zebina* Walker.

Very similar to the next preceding species, but the dusting of the frontal orbits is more brownish, and that of the postocular orbits is silvery white unless towards the lower extremities, where it shows a trace of yellow. The dusting

of the mesonotum is also brownish on the disc, contrasting with the whitish grey of the humeri and lateral margins.

Length, 13 mm.

In structure very similar to *chryseps*, but the sexual patch on the fourth tergite is smaller, not covering the posterior margin of the tergite below, and not showing as markedly above.

Savaii: Safune, v.1924 (E. H. Bryan, Jun.).

This ♂ agrees with one from Australia identified as *zebina* by Miss D. Aubertin.

Masicera fulvoventris, Meg., appears to be a prior name for this species judging from a specimen from Bigot in the collection of the United States National Museum.

Two females from the same locality may belong to this species, but they have the postocular orbits yellow dusted, and I can find no reliable character for separating them from *chryseps*.

The species which I believe to be *Masicera cilipes*, Macquart, and which may be that identified as *sericariae* by Bezzi, has the postocular orbits yellow dusted above, but above middle the dusting becomes whitish, and the lower third or more is silvery white. The specimens also run considerably larger than those before me, and the wings are more conspicuously blackened basally. This type of wing marking is not confined to this genus, as I find species that belong to *Phorocera* and two or three related genera in which it occurs also.

Winthemia Robineau-Desvoidy.

Bezzi has recorded one species of this genus from Fiji.

23. Winthemia dispar Macquart.

Three females that I accept as possibly this species have the face white dusted and the parafacials entirely white haired. The mesopleura is black haired on the disc, but there are some slightly crinkly yellowish white hairs on the hind margin.

Tutuila, Savaii, and Upolu. Recorded from Fiji by Bezzi.

It is possible that this is the same as *albiceps*, Malloch, described from Australia, but I have not seen a male from Samoa.

23A. *Winthemia pacifica*, n. sp.

Male.—Similar to *dispar* as here accepted, but with the parafacials entirely black haired.

Length, 11 mm.

Head black; antennae entirely black; palpi black, becoming reddish at apices; interfrontalia blackish brown; frontal orbits, face, and postocular orbits white dusted, the first mentioned slightly yellowish above; genae with the dust showing less than that on face because of the presence of dense dark hairs. All the hairs on the parafacials black. Frons at vertex about twice as wide as height of gena; the inner verticals strong, outer pair small; postverticals shorter than the ocellars; no upper reclinate orbital present. Parafacial at middle about half as wide as the third antennal segment, the latter about three times as long as second segment; gena about as high as width of third antennal segment.

Thorax black, humeri concolorous, the dust grey, mesonotum with the usual four dark vittae not conspicuous; scutellum reddish yellow from before middle to apex. Pleural hairs except those on hind margin of the mesopleura black, the pale hairs yellow, and crinkly like the dark hairs on the pteropleura. Sternopleurals 1+1.

Legs black. Mid tibia with a submedian ventral bristle; hind tibia with no outstanding bristle in the anterodorsal series.

Abdomen black, the sides of first two visible tergites and anterior half of the sides of next red, the bases with whitish grey dust. Second visible tergite without central apical bristles; sensory patch on fourth tergite well developed, large, and with the hairs strong, bristle-like, the third tergite with shorter ventral hairs. Superior hypopygial forceps tapered to a point, almost beak-like in profile.

Squamae yellowish white. Knobs of halteres fuscous.

Holotype, Tonga: Neiafu, Vavau, 1.iii.1925 (Hopkins).

The entirely white dusted face readily distinguishes the species from the one I accept as the Australian *trichoparia*, Schiner.

Compsilura Bouché.

This genus is represented in Europe by a single species, *concinna*, Meigen, of which I have seen many typical examples from the Federated Malay States.

In the collection from Samoa there is a second species that differs in size and armature of the frons as well as in some other characters from the genotype. The genus is readily distinguished from its allies by the lack of ocellar bristles, and in the ♀ by the spinose ventral edges of the third and fourth abdominal tergites, and by the possession of a long curved spike-like process at the apex of the abdomen, which is usually curved forward close against the venter of the abdomen.

24. *Compsilura samoensis*, n. sp.

Female.—A small black species, with the dusting of the head, thorax, and abdomen pale grey, the antennae black, and the palpi fulvous yellow.

Length, 5 mm.

Head black, the frontal orbits, face, genae, and occiput densely pale grey dusted; antennae black, second segment brownish; palpi fulvous yellow; occipital hairs whitish yellow, the other hairs and bristles black. Frons at vertex about one-fourth of the head width, much widened to anterior margin, the orbits at upper proclinate bristle but little narrower than the interfrontalia. Each orbit with two upper reclinate bristles, the uppermost one of the three present in the genotype represented by a short fine hair; two strong proclinate outer bristles; and three incurved inner marginals in front, the weaker fourth one of the genotype hardly developed, the lower bristle opposite apex of second antennal segment and midway between inner margin of parafacial and eye. In other respects similar to *concinata*, but the palpi have very few hairs on their outer sides as compared with it.

Thorax more distinctly shining than in *concinata*, the vittae more conspicuous.

Legs black. Abdomen with the grey dust covering less of the basal portions of the tergites than in *concinata*, and the short spines on the edges of the third tergite less strongly developed and less numerous.

Holotype ♀, Tutuila: Pago Pago, 14.xii.1925 (Buxton and Hopkins).

Paratypes, Upolu: Tuaeufu, 16.ix.1923 (Swezey and Wilder); Savaii: Safune, rain forest, 2,000–4,000 feet, 2.v.1924 (Bryan).

Voriella Malloch.

I described this genus from Australia, and included therein three species. The distinguishing characters consist of the presence of hairs on the centre of

the propleura, the extension of the frontal bristles downward on the parafacials to or beyond the apex of the second antennal segment, the presence of discal abdominal bristles, the lack of hairs on the eyes, and the position of the inner cross vein, which is near midway between the inner one and the bend of the fourth vein.

There is one species in the Samoan material that appears to be undescribed.

25. *Voriella setiventris*, n. sp.

Male.—Similar in most respects to *inconspicua*, Malloch, but with stronger abdominal bristles.

Length, 6 mm.

Head black, with dense whitish grey dusting, the interfrontalia brownish black; antennae black; palpi fuscous. Frons at vertex about one-seventh of the head width, parallel-sided for more than half its length, widened in front; vertical, postvertical, and ocellar bristles short and fine, the inner verticals slightly stronger; each orbit with an inner marginal series of well-developed bristles, the upper two on each somewhat recurved, the second one the stronger, the other bristles incurved, the series below level of base of antennae closer than the others and carried to about level of the insertion of the aristae, a few fine hairs close to bases of the bristles on frontal orbits, none on the parafacials. Antennae inserted at middle of eye in profile, reaching to epistome, the third segment about 1.5 times as long as second, broadly rounded at apex; aristae thickened at bases, tapered to middle, subnude; palpi slightly thickened to apices. Parafacial in profile much narrowed to below middle; gena higher than width of third antennal segment, the surface bristles rather strong.

Thorax shining black, with quite dense greyish white dust which divides the mesonotum into three broad black vittae, the apex of the scutellum rather broadly pale dusted. Mesonotum with three pairs of postsutural dorsocentrals, two pairs of postsutural intra-alars, four bristles on the lateral presutural area, the prealar short, both notopleurals long, and three pairs of presutural acrostichals; pteropleura with only a number of stiff hairs, no long bristle; sternopleura with two bristles, and the prosternum with two or three bristly hairs on each side.

Legs black. Fore tarsus longer than fore tibia; mid tibia with a strong submedian ventral bristle; hind tibia with two or three weak anteroventral

bristles, and three or four bristles on the anterodorsal and posterodorsal surfaces, the one nearest apex in each series the longest.

Wings greyish hyaline, slightly smoky basally, the veins dark brown. Costal thorn undeveloped, third vein with one strong bristle above at base and three weaker bristles at base below; first posterior cell narrowly open, ending rather close to wing tip, the outer cross vein close to midway from inner to bend of fourth, the latter subangulate, the section beyond the bend almost straight, on both wings with a weakly developed short spur close to middle on inner side.

Abdomen glossy black, seen from some angles with a brownish caste, each tergite with a conspicuous basal fascia of white dust that is narrow centrally and widens out laterally. All tergites with apical central bristles, second to fourth also with central discal bristles. Hypopygium small, with fine short hairs, the tergite before it with about four discal bristles.

Squamae yellowish brown. *Halteres* yellow.

Holotype ♂, Tutuila: Fagasa, 9.ix.1923 (Swezey and Wilder).

Neomedina, n. gen.

Similar to *Medina*, R.-D. (= *Degeeria*, Meigen), differing mainly in the lack of discal bristles on the abdomen. For other characters see description given below.

Genotype, the following new species.

26. *Neomedina atripennis*, n. sp.

A glossy black species, with silvery white dust on the head, thorax, and abdomen; the antennae, palpi, and legs, black, and the wings conspicuously blackened from base to apex on the costa, more widely so at base, the darker colour tapering off behind, but distinct along the veins.

Length, 8 mm.

♂. *Head* black, densely silvery dusted except on interfrontalia and a mark below each eye which are brownish black. Frons at vertex about one-half as wide as one eye, widened in front, the orbits almost as wide as the interfrontalia above; outer vertical bristles reduced to short hairs, about as long as the ocellar pair, the inner pair long and strong; each orbit with an inner marginal series of long bristles, the uppermost two or three on each reclinate, the others more definitely incurved, the bristles carried downward on parafacials to

distinctly below level of apex of second antennal segment, laterad of the bristles there are some fine hairs, but these are not carried downward as far as the bristles. Profile as Fig. 14, the bristles on the facial ridges rather variable in strength and extent, but always more strongly developed and widely separated than in *Degeeria*. Third antennal segment about five times as long as second. Back of head centrally and below with white hairs.

Thorax shining black, pleura with an oblique stripe of white dust over the mesopleura and sternopleura, the mesonotum with lateral margins conspicuously white dusted, the central stripe less noticeably white dusted, and the stripes over the series of dorsocentrals brownish dusted, the black intervening stripes linear. Dorsocentrals and acrostichals 3+3; prealar long; postsutural intra-alars 3; presutural sublateral area with 4 bristles; sternopleura with 2 bristles; the pteropleural well developed; prosternum haired on sides, and propleura bare in centre.

Legs normal. Claws long; hind tibia without an anterodorsal fringe.

Abdomen glossy black, conical, tapered to apex, the hypopygium small and hidden. All tergites with strong apical hind marginal bristles, the pair on first visible tergite the weakest, the surface hairs strong, moderately long, and decumbent. The basal silvery white dusted fascia on each tergite is narrowed above and usually lacking centrally so that there is an elongate mark on each side.

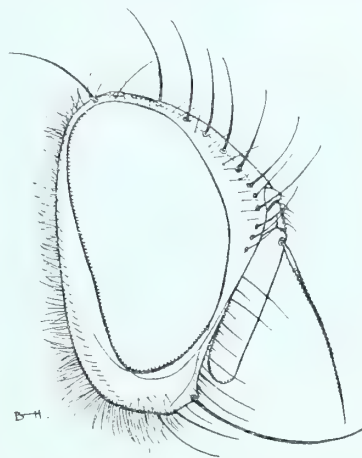
Wing as Fig. 15. First vein bare, third with setulose hairs from base to a short distance from inner cross vein.

Squamae white. *Halteres* fuscous.

♀. Similar to the ♂ in general appearance and colour, but the white marks on the abdomen are broader, the frons is a little wider and has two outer proclinate bristles on the upper half, and the abdomen is stouter and more tapered at apex. There is no trace of any abnormal development of spinose armature on the venter of this sex.

Type ♂, allotype, and one ♂ paratype, Savaii: Salailua, 23.v.1924 (Bryan).

I have carefully examined all the available material of species apparently



TEXT-FIG. 14.—*Neomedina atripennis*, profile of head.

closely related to this in the United States National Museum, and though I realize that the number of genera in the family is rather oppressive, I cannot avoid erecting a new one for the species before me. Dr. Aldrich in the Museum collection has adopted the generic name *Medina* for the genus usually called *Degeeria*, and places thereunder also *Amedoria*, Brauer and von Bergenstamm,



TEXT-FIG. 15.—*Neomedina atripennis*, wing.

with one or two additional and much more recent genera described by Townsend. All have well-developed discal abdominal bristles, but the other characters are similar to those of the Samoan species, and it is probable that a thorough review of all related genera will result in the reduction of the latter to a subgenus.

TRIBE ACTIINI.

Actia Robineau-Desvoidy.

27. *Actia hyalinata* Malloch.

I identify one female as this Malayan species. Bezzi described *stiglinae* from Fiji as the only species in his material from these islands. It differs from *hyalinata* in having the first wing vein unarmed, and the third vein with only seven or eight bristles on the upper side which extend to a little beyond the inner cross vein. In *hyalinata* the first vein is setulose both above and below apically, and the third is bristled to beyond the level of the outer cross vein.

Tutuila : Pago Pago, 14.xii.1925.

TRIBE DEXIINI.

In this book on the Diptera of Fiji Bezzi used the subfamily name Pyrrhosiinae instead of the one here used, and recorded two genera and three species. In this collection I find one of his genera and one species ; another,

though widely distributed throughout the region, was not recorded by him. It possibly occurs in Fiji, and, though the specimen now before me is from the New Hebrides, in Samoa also.

Rhinomyiobia Brauer and von Bergenstamm.

An Australian genus which extends its range to Fiji and Samoa.

28. *Rhinomyiobia plumifera* Bezzi.

One specimen of this Fijian species.

Tau, Manua, 27.ix.1923 (Swezey and Wilder).

Prosenia St. Fargeau et Serville.

A widely distributed genus which has a large number of Australian species.

28A. *Prosenia sibirita* Fabricius.

A much damaged female specimen appears to belong to this or a very closely allied species, but without a male it is impossible to definitely identify the species.

New Hebrides : Tanna, ix.1925 (Buxton).

SARCOPHAGIDAE.*

29. *Sarcophaga (Helicobia) australis* Johnston and Teigs.

Three males of this small Australian species are before me. It is probable that the species is widely distributed in the Australian region, but its small size may prevent its ready collection.

Tutuila : Pago Pago, 14.xii.1925 ; Upolu : Mulifanua, 16.vii.1925 (Wilder) ; Malololelei, 8.vii.1925 (Wilder).

* Supplementary to *Sarcophagidae* by P. A. Buxton, pp. 141-150 of present part, published 11th May, 1929.

EXPLANATION OF FIGURES.

- Fig. 1. *Diploneura instabilis*, basal half of costa of wing showing veins 1 to 3.
 „ 2. *Megaselia insulana*, costa of wing.
 „ 3. „ *perturbans*, costa of wing.
 „ 4. „ „ hind tibia from behind.
 „ 5. „ *pacifica*, costa of wing.
 „ 6. „ *basiseta*, costa of wing.
 „ 7. „ „ hind tibia.
 „ 8. *Puliciphora lucifera*, wing.
 „ 9. *Chonocephalus dorsalis*, wing.
 „ 10. *Phytomyza spicata*, Malloch, wing (a) and antenna (b).
 „ 11. *Calobata pallipes*, Loew, anterior extremity of thorax in profile, left side.
 „ 12. *Neocalobata deferens*, anterior extremity of thorax in profile, left side.
 „ 13. *Neocalobata deferens*, basal half of wing.
 „ 14. *Neomedina atripennis*, profile of head.
 „ 15. „ „ wing.



INSECTS OF SAMOA

AND OTHER SAMOAN TERRESTRIAL ARTHROPODA

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 „ II. Hemiptera. (Complete.)
 „ III. Lepidoptera. (Complete.)
 „ IV. Coleoptera. (Complete.)
 „ V. Hymenoptera. (Complete.)
 „ VI. Diptera. (Complete.)
 „ VII. Other Orders of Insects. (Complete.)
 „ VIII. Terrestrial Arthropoda other than Insects. (Complete.)
 „ IX. Summary and Index.

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